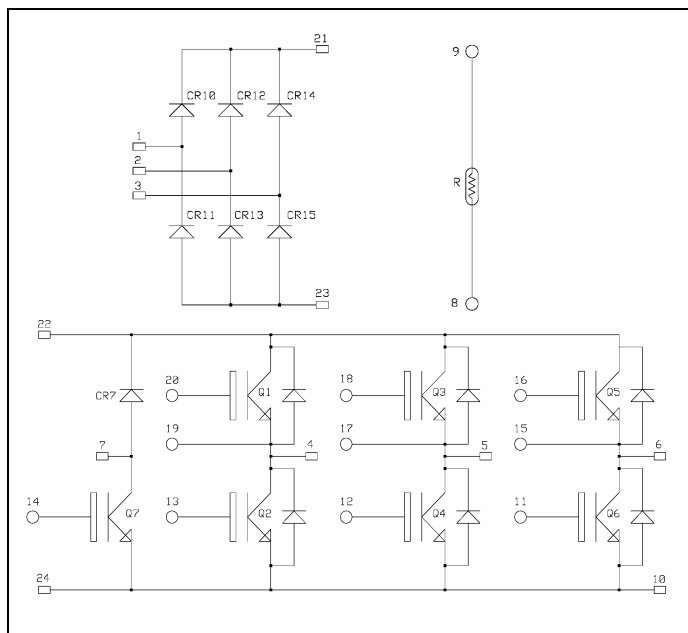


## Input rectifier bridge + Brake + 3 Phase Bridge NPT IGBT Power Module

$$V_{CES} = 1200V$$

$$I_C = 25A @ T_c = 80^{\circ}C$$



APTGS25X120RTP2: Without Brake (Pin 7 & 14 not connected)



All ratings @  $T_j = 25^{\circ}C$  unless otherwise specified

### 1. Absolute maximum ratings

**Diode rectifier** Absolute maximum ratings

Symbol	Parameter		Max ratings	Unit
$V_{RRM}$	Repetitive Peak Reverse Voltage		1600	V
$I_D$	DC Forward Current	$T_C = 80^{\circ}C$	25	A
$I_{FSM}$	Surge Forward Current	$T_j = 25^{\circ}C$	300	
		$T_j = 150^{\circ}C$	230	



**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

### Application

- AC Motor control

### Features

- Non Punch Through (NPT) Low Loss IGBT®
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - Avalanche energy rated
  - RBSOA and SCSOA rated
- Very low stray inductance
- High level of integration
- Internal thermistor for temperature monitoring

### Benefits

- Low conduction losses
- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- Low profile

## IGBT & Diode Brake (only for APTGS25X120BTP2) Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	1200	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ\text{C}$ 20	A
		$T_C = 80^\circ\text{C}$ 12.5	
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ\text{C}$ 25	
$V_{GE}$	Gate – Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$ 100	W
$I_F$	DC Forward Current	$T_C = 80^\circ\text{C}$ 25	A

## IGBT & Diode Inverter Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	1200	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ\text{C}$ 45	A
		$T_C = 80^\circ\text{C}$ 25	
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ\text{C}$ 50	
$V_{GE}$	Gate – Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$ 230	W
SCSOA	Short circuit Safe Operating Area	$T_j = 125^\circ\text{C}$ 160A @ 720V	
$I_F$	DC Forward Current	$T_C = 80^\circ\text{C}$ 25	A
$I_{FSM}$	Surge Forward Current	$t_p = 1\text{ms}$ $T_C = 80^\circ\text{C}$ 50	

## 2. Electrical Characteristics

### Diodes Rectifier Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_R$	Reverse Current	$V_R = 1600\text{V}$ $T_j = 150^\circ\text{C}$		2		mA
$V_F$	Forward Voltage	$I_F = 30\text{A}$ $T_j = 25^\circ\text{C}$		1.3	1.5	V
		$I_F = 25\text{A}$ $T_j = 150^\circ\text{C}$		1.05	1.1	
$R_{thJC}$	Junction to Case				1	$^\circ\text{C/W}$

### IGBT Brake & Diode (only for APTGS25X120BTP2) Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}$ $V_{CE} = 1200\text{V}$ $T_j = 25^\circ\text{C}$		0.5	500	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$		0.8		mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15\text{V}$ $I_C = 12.5\text{A}$ $T_j = 25^\circ\text{C}$		2.7	3.15	V
		$T_j = 125^\circ\text{C}$		3.1		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 0.35\text{mA}$	4.5	5.5	6.5	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			300	nA
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		600		pF
$V_F$	Forward Voltage	$V_{GE} = 0\text{V}$ $I_F = 25\text{A}$ $T_j = 25^\circ\text{C}$		2.05	2.4	V
		$T_j = 125^\circ\text{C}$		1.9		
$R_{thJC}$	Junction to Case	IGBT			1.2	$^\circ\text{C/W}$
		Diode			1.2	

## IGBT & Diode Inverter Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
BV <sub>CES</sub>	Collector - Emitter Breakdown Voltage	V <sub>GE</sub> = 0V, I <sub>C</sub> = 500μA	1200			V
I <sub>CES</sub>	Zero Gate Voltage Collector Current	V <sub>GE</sub> = 0V V <sub>CE</sub> = 1200V		1.5	500	μA
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C		2		mA
V <sub>CE(on)</sub>	Collector Emitter on Voltage	V <sub>GE</sub> = 15V I <sub>C</sub> = 25A		2.1	2.55	V
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C		2.45		
V <sub>GE(th)</sub>	Gate Threshold Voltage	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 1mA	4.5	5.5	6.5	V
I <sub>GES</sub>	Gate – Emitter Leakage Current	V <sub>GE</sub> = 20V, V <sub>CE</sub> = 0V			300	nA
C <sub>ies</sub>	Input Capacitance	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 25V f = 1MHz		1500		pF
T <sub>d(on)</sub>	Turn-on Delay Time	Inductive Switching (25°C) V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 600V I <sub>C</sub> = 25A R <sub>G</sub> = 27Ω		45		ns
T <sub>r</sub>	Rise Time			45		
T <sub>d(off)</sub>	Turn-off Delay Time			290		
T <sub>f</sub>	Fall Time			60		
T <sub>d(on)</sub>	Turn-on Delay Time	Inductive Switching (125°C) V <sub>GE</sub> = ±15V V <sub>Bus</sub> = 600V I <sub>C</sub> = 25A R <sub>G</sub> = 27Ω		45		ns
T <sub>r</sub>	Rise Time			45		
T <sub>d(off)</sub>	Turn-off Delay Time			340		
T <sub>f</sub>	Fall Time			80		
E <sub>off</sub>	Turn off Energy			3.2		mJ
V <sub>F</sub>	Forward Voltage	V <sub>GE</sub> = 0V I <sub>F</sub> = 25A		2.05	2.5	V
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C		1.9		
Q <sub>rr</sub>	Reverse Recovery Charge	I <sub>F</sub> = 25A V <sub>R</sub> = 600V di/dt=800A/μs		2.1		μC
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C		4.5		
R <sub>thJC</sub>	Junction to Case		IGBT		0.55	°C/W
			Diode		1.2	

## Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C		5		kΩ
B <sub>25/50</sub>	T <sub>25</sub> = 298.16 K		3375		K

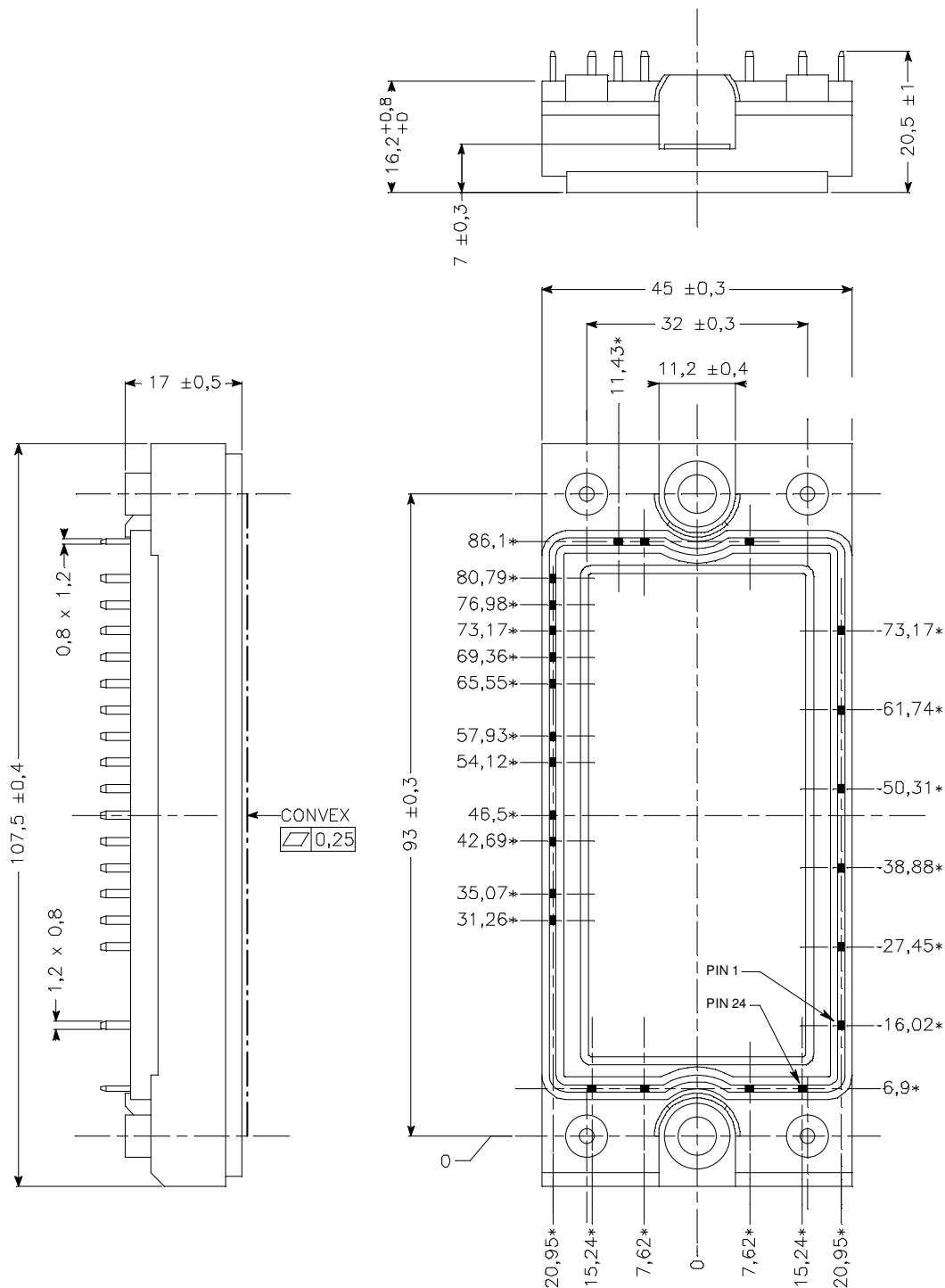
$$R_T = \frac{R_{25}}{\exp \left[ B_{25/50} \left( \frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

## 3. Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t =1 min, I <sub>isol</sub> < 1mA, 50/60Hz	2500			V
T <sub>J</sub>	Operating junction temperature range	-40		150	°C
T <sub>STG</sub>	Storage Temperature Range	-40		125	
T <sub>C</sub>	Operating Case Temperature	-40		125	
Torque	Mounting torque	To Heatsink	M5	3.3	N.m
Wt	Package Weight			185	g

**4. Package outline**



ALL DIMENSIONS MARKED " \* " ARE TOLERENCED AS :  $\pm 0,4$

**APT reserves the right to change, without notice, the specifications and information contained herein**

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